Space Weather Forecast

Issued on Wednesday, 15 March 2023 at 00:24 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Chance of G1/Minor Geomagnetic storms due to possible glancing coronal mass ejections on days 1 and 2 (15 and 16 March). S1/Minor Radiation storm expected on day 1 (15th).

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Low or Very Low in the past 24 hours with isolated C-class flares. There are currently eight sunspot regions currently on the Earth-facing disc. These are a mixture of small, mature spots with a couple of small but emergent/developing regions. All spots however, are magnetically simple at present. There are also several filaments on the disc, which should any erupt, could be another source of C-class flares.

No Earth directed CME's have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: The solar wind has perhaps been indicative of a glancing transient or weak coronal hole fast wind arrival, with speeds increasing from background to slightly elevated levels between 14/0400-0900 UTC, before slowly easing back to near background levels. The magnetic field strength was weak to moderate, with the important north-south component variable but often southward. Geomagnetic activity was Quiet to Active (Kp 2-4).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) has risen back above the S1 level, likely due to the ongoing effects from the significant far-sided eruption early on the 13th, with a peak of 18pfu at 14/2220UTC.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to continue Low or Very Low, with a slight chance of an isolated M-class flare.

Solar Wind / Geomagnetic Activity: Glancing coronal mass ejection impacts are possible 14 March and through 15 March, due to three filament eruptions that occurred 10-13 March. These are all low confidence, however any combined effect could give a larger geomagnetic response than normally expected from such glancing impacts. Otherwise, an average of slightly elevated solar winds are expected through much of the period, with a chance of becoming elevated due to the faster winds from coronal hole 84 early in the period. Quiet to Unsettled geomagnetic activity is expected, with possible Active intervals. The arrival of any coronal mass ejections will likely bring Active intervals with a chance of G1 Minor Storm intervals from 15 March until 16 March, before easing to mainly Quiet by 17 March.

Energetic Particles / Solar Radiation: The count rate of energetic particles is currently at S1/Minor storm levels but is expected to gradually decline back to background levels through the period.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	40	30	1	1
Strong	G3	No	2	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	No	5	5	5	10
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	Yes	99	20	1	1
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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